

WHAT IS CLAIMED IS:

1 1. A method for the preparation of a substantially pore-free article of
2 rubber other than cis-1,4-polyisoprene, said method comprising:
3 (a) dipping a forming member in a liquid medium comprising
4 (i) a rubber-forming substance other than cis-1,4-polyisoprene and
5 (ii) a vulcanizing agent,
6 said forming member having an outer surface with a contour complementary to
7 that of said article;
8 (b) withdrawing said forming member from said liquid medium in such a
9 manner as to leave a film of said liquid medium over said outer surface;
10 (c) immersing said forming member with said liquid film thereon in a
11 chemically inert liquid bath at a temperature and for a period of time sufficient to
12 cause vulcanization of said rubber-forming substance by said vulcanizing agent;
13 and
14 (d) withdrawing said forming member from said liquid bath and
15 separating said substantially pore-free rubber article from said forming member.

1 2. A method in accordance with claim 1 in which said rubber-forming
2 substance is a member selected from the group consisting of natural rubber,
3 polychloroprene, nitrile rubber, polyurethane, styrene block polymer, and butyl rubber.

1 3. A method in accordance with claim 1 in which said rubber-forming
2 substance is a polyurethane thermoplastic elastomer.

1 4. A method in accordance with claim 1 in which said rubber-forming
2 substance is a polyurethane thermoplastic elastomer and said liquid medium is an aqueous
3 dispersion.

1 5. A method in accordance with claim 1 in which said rubber-forming
2 substance is a thermoplastic styrenic block copolymer.

1 6. A method in accordance with claim 1 in which said rubber-forming
2 substance is a thermoplastic styrenic block copolymer and said liquid medium is an
3 aqueous dispersion.

1 7. A method in accordance with claim 1 in which said liquid medium
2 of step (a) is a latex.

1 8. A method in accordance with claim 1 in which said liquid medium
2 of step (a) is a solution.

1 9. A method in accordance with claim 1 in which said rubber-forming
2 substance is a member selected from the group consisting of natural rubber and
3 polychloroprene.

1 10. A method in accordance with claim 1 in which said liquid bath of
2 step (c) is a member selected from the group consisting of molten inorganic salts, oils,
3 glycols, liquified metals, water, and brine solutions.

1 11. A method in accordance with claim 1 in which said liquid bath of
2 step (c) is a member selected from the group consisting of molten inorganic salts, silicone
3 oils, and glycols.

1 12. A method in accordance with claim 1 in which said liquid bath of
2 step (c) is a member selected from the group consisting of molten inorganic salts and
3 mixtures thereof.

1 13. A method in accordance with claim 12 in which said molten
2 inorganic salts are members selected from the group consisting of nitrates, nitrites,
3 carbonates, sulfates, phosphates, and halides of potassium, sodium and lithium.

1 14. A method in accordance with claim 1 in which said temperature of
2 step (c) is from about 100°C to about 350°C.

1 15. A method in accordance with claim 1 in which said rubber-forming
2 substance is a member selected from the group consisting of polychloroprene and styrene-
3 butadiene rubber, and said temperature of step (c) is from about 150°C to about 300°C.

1 16. A method in accordance with claim 1 in which said rubber-forming
2 substance is natural rubber, and said temperature of step (c) is from about 150°C to about
3 235°C.

1 17. A method in accordance with claim 1 in which said vulcanizing
2 agent is a member selected from the group consisting of organic peroxides, sulfur-
3 containing compounds, selenium-containing compounds, and tellurium-containing
4 compounds.

1 18. A method in accordance with claim 1 in which said vulcanizing
2 agent is a member selected from the group consisting of diacyl peroxides, peroxyketals,
3 dialkyl peroxides, mercaptothiazoles, thiuram sulfides, thiuram disulfides, guanidines,
4 zinc dialkyl dithiocarbamates, selenium dialkyl dithiocarbamates, sodium
5 diethyldithiocarbamate, potassium diethyldithiocarbamate, alkyl phenol sulfides, sulfur-
6 containing polymers, and benzothiazyl disulfide.

1 19. A method in accordance with claim 1 in which said vulcanizing
2 agent is an organic peroxide.

1 20. A method in accordance with claim 1 in which said vulcanizing
2 agent is a combination of an organic peroxide and a member selected from the group
3 consisting of multifunctional salts of acrylic and methacrylic acids.

1 21. A method in accordance with claim 1 in which said vulcanizing
2 agent is a dicumyl peroxide.

1 22. A method in accordance with claim 1 in which said vulcanizing
2 agent is a combination of dicumyl peroxide and zinc dimethacrylate.

1 23. A method in accordance with claim 1 in which said rubber-forming
2 substance of step (a) is not vulcanized prior to step (a).

1 24. A method in accordance with claim 1 further comprising partially
2 vulcanizing said rubber-forming substance prior to step (a).

1 25. A method in accordance with claim 24 in which said partial
2 vulcanizing is achieved by high energy irradiation.

1 26. A method for increasing the tensile strength of an article of
2 vulcanized rubber, said method comprising:

3 (a) immersing said article in a solution of a vulcanizing agent to cause
4 said article to absorb said second vulcanizing agent from said solution;

5 (b) immersing said article containing said absorbed vulcanizing agent in a
6 chemically inert liquid bath at a temperature and for a period of time sufficient to
7 cause further vulcanization said vulcanized rubber by said vulcanizing agent; and

8 (c) withdrawing said article from said liquid bath.

1 27. A method in accordance with claim 26 in which said vulcanized
2 rubber is vulcanized cis-1,4-polyisoprene.

1 28. A method in accordance with claim 26 in which said liquid bath is
2 a member selected from the group consisting of molten inorganic salts and mixtures
3 thereof.

1 29. A method for the preparation of a substantially pore-free article of
2 rubber, said method comprising:

3 (a) dipping a forming member in a liquid medium comprising

4 (i) a rubber-forming substance and

5 (ii) a first vulcanizing agent,

6 said forming member having an outer surface with a contour complementary to
7 that of said article;

8 (b) withdrawing said forming member from said liquid medium in such a
9 manner as to leave a film of said liquid medium over said outer surface;

10 (c) immersing said forming member with said liquid film thereon in a first
11 chemically inert liquid bath at a temperature and for a period of time sufficient to
12 cause vulcanization of said rubber-forming substance by said first vulcanizing
13 agent;

14 (d) withdrawing said forming member with a film of vulcanized rubber
15 thereon from said liquid bath;

16 (e) immersing said film of vulcanized rubber formed in step (d) in a
17 solution of a second vulcanizing agent to cause said film to absorb said second
18 vulcanizing agent from said solution;

19 (f) immersing said film containing said absorbed second vulcanizing agent
20 in a second chemically inert liquid bath at a temperature and for a period of time

21 sufficient to cause further vulcanization of said rubber-forming substance by said
22 second vulcanizing agent; and
23 (g) withdrawing said film from said second liquid bath to achieve said
24 substantially pore-free rubber article.

1 30. A method in accordance with claim 29 in which said rubber is
2 cis-1,4-polyisoprene.

1 31. A method in accordance with claim 29 in which said liquid bath is
2 a member selected from the group consisting of molten inorganic salts and mixtures
3 thereof.

1 32. A dip-molded article of a rubber other than cis-1,4-polyisoprene
2 that is substantially pore-free, formed by a process comprising:

3 (a) dipping a forming member in a liquid medium comprising
4 (i) a rubber-forming substance other than cis-1,4-polyisoprene and
5 (ii) a vulcanizing agent,

6 said forming member having an outer surface with a contour complementary to
7 that of said article;

8 (b) withdrawing said forming member from said liquid medium in such a
9 manner as to leave a film of said liquid medium over said outer surface;

10 (c) immersing said forming member with said liquid film thereon in a
11 chemically inert liquid bath at a temperature and for a period of time sufficient to
12 cause vulcanization of said rubber-forming substance by said vulcanizing agent;
13 and

14 (d) withdrawing said forming member from said liquid bath and
15 separating said substantially pore-free article of rubber article from said forming
16 member.

1 33. A dip-molded article in accordance with claim 32 in which said
2 rubber-forming substance is a member selected from the group consisting of natural
3 rubber, polychloroprene, nitrile rubber, polyurethane, styrene block polymer, and butyl
4 rubber.

1 34. A dip-molded article in accordance with claim 32 in which said
2 rubber-forming substance is a polyurethane thermoplastic elastomer.

1 35. A dip-molded article in accordance with claim 32 in which said
2 rubber-forming substance is a polyurethane thermoplastic elastomer and said liquid
3 medium is an aqueous dispersion.

1 36. A dip-molded article in accordance with claim 32 in which said
2 rubber-forming substance is a thermoplastic styrenic block copolymer.

1 37. A dip-molded article in accordance with claim 32 in which said
2 rubber-forming substance is a thermoplastic styrenic block copolymer and said liquid
3 medium is an aqueous dispersion.

1 38. A dip-molded article in accordance with claim 32 in which said
2 liquid medium of step (a) is a latex.

1 39. A dip-molded article in accordance with claim 32 in which said
2 liquid medium of step (a) is a solution.

1 40. A dip-molded article in accordance with claim 32 in which said
2 rubber-forming substance is a member selected from the group consisting of natural
3 rubber and polychloroprene.

1 41. A dip-molded article in accordance with claim 32 in which said
2 liquid bath of step (c) is a member selected from the group consisting of molten inorganic
3 salts, oils, glycols, liquified metals, and brine solutions.

1 42. A dip-molded article in accordance with claim 32 in which said
2 liquid bath of step (c) is a member selected from the group consisting of molten inorganic
3 salts, silicone oils, and glycols.

1 43. A dip-molded article in accordance with claim 32 in which said
2 liquid bath of step (c) is a member selected from the group consisting of molten inorganic
3 salts and mixtures thereof.

1 44. A dip-molded article in accordance with claim 43 in which said
2 molten inorganic salts are members selected from the group consisting of nitrates, nitrites,
3 carbonates, sulfates, phosphates, and halides of potassium, sodium and lithium.

1 45. A dip-molded article in accordance with claim 32 in which said
2 temperature of step (c) is from about 100°C to about 350°C.

1 46. A dip-molded article in accordance with claim 32 in which said
2 rubber-forming substance is a member selected from the group consisting of
3 polychloroprene and styrene-butadiene rubber, and said temperature of step (c) is from
4 about 150°C to about 300°C.

1 47. A dip-molded article in accordance with claim 32 in which said
2 rubber-forming substance is natural rubber, and said temperature of step (c) is from about
3 150°C to about 235°C.

1 48. A dip-molded article in accordance with claim 32 in which said
2 vulcanizing agent is a member selected from the group consisting of organic peroxides,
3 sulfur-containing compounds, selenium-containing compounds, and tellurium-containing
4 compounds.

1 49. A dip-molded article in accordance with claim 32 in which said
2 vulcanizing agent is a member selected from the group consisting of diacyl peroxides,
3 peroxyketals,, dialkyl peroxides, mercaptothiazoles, thiuram sulfides, thiuram disulfides,
4 guanidines, zinc dialkyl dithiocarbamates, selecium dialkyl dithiocarbamates, sodium
5 diethyldithiocarbamate, potassium diethyldithiocarbamate, alkyl phenol sulfides, sulfur-
6 containing polymers, and benzothiazyl disulfide.

1 50. A dip-molded article in accordance with claim 32 in which said
2 vulcanizing agent is an organic peroxide.

1 51. A dip-molded article in accordance with claim 32 in which said
2 vulcanizing agent is dicumyl peroxide.

1 52. A dip-molded article in accordance with claim 32 in which said
2 rubber-forming substance of step (a) is not vulcanized prior to step (a)

1 53. A dip-molded article in accordance with claim 32 in which said
2 rubber-forming substance is partially vulcanized prior to step (a).

1 54. A dip-molded article in accordance with claim 53 in which said
2 rubber-forming substance is partially vulcanized prior to step (a) by high energy
3 irradiation.